

PATENT ABSTRACTS OF JAPAN

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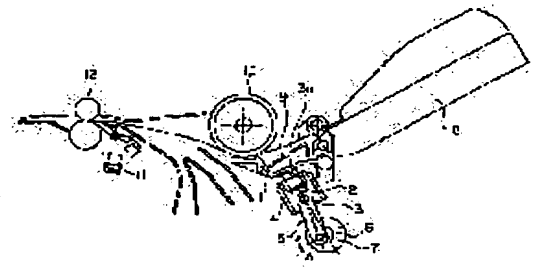
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(54) SHEET FEEDING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To form a loop of paper completely and prevent improper compensation of oblique travel and improper picture image position in advance by changing pressurizing force for a sheet by a separation means and a feeding means while the sheet is fed by the feeding means.

SOLUTION: When a sensor detects a tip of a paper, a controller senses that it is just before the paper forms a loop and gives a command to a cam plate drive motor to rotate by a predetermined amount. A cam plate 7 starts to rotate in the arrow A direction and moves a piston member 3 upward. Consequently, a compression coil spring increases pressurizing force of a separation pad 1 from below so that pressurizing force of the separation pad 1 becomes the maximum before a complete loop of paper is formed. In this way, by increasing pressurizing force during a loop formation process without changing pressurizing force of the separation pad 1 during a separation process, it is possible to prevent the travel of the separation pad in the direction opposite to the direction of pressurization because it succumbs to the stiffness of a thick paper, the retraction of a rear part of the paper in the direction opposite to the direction of conveyance, and the formation of incomplete loop of paper.



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CLAIMS

[Claim(s)]

[Claim 1] A feed means to feed with a sheet, and the separation means for opposite arrangement being carried out and dividing a sheet into a feed means, In the sheet feeding device which it has [feeding device] a conveyance means for it to be located in the sheet conveyance direction lower stream of a river, and to convey a sheet from a feed means, and the sheet tip with which it feeds with a feed means is dashed [feeding device] against a conveyance means, and makes a loop formation form in a sheet The sheet feeding device characterized by constituting the welding pressure to the sheet by the separation means and the feed means possible [fluctuation] during feed of the sheet by the feed means.

[Claim 2] The sheet feeding device according to claim 1 with which the sheet in the condition of a separation stroke being completed and being fed with the sheet from the contact pressure of the sheet in the condition that two or more sheets are divided into the sheet of one sheet, and a separation means, and contact pressure of a separation means are characterized by the high thing.

[Claim 3] The sheet feeding device according to claim 1 or 2 characterized by increasing the welding pressure to the sheet by the separation means by supporting said separation means rockable, establishing a migration means to make a separation means approach and estrange to a feed means, and carrying out rocking contiguity of the separation means with a migration means during feed of a sheet at a feed means side.

[Claim 4] The migration means of said separation means is a sheet feeding device according to claim 3 characterized by having the cam member which can be rotated freely, the reciprocation member guided by the guide member, the link which transmits movement of a cam member to a piston member, and the spring which transmits movement of a reciprocation member to a separation member.

[Claim 5] It is the sheet feeding device according to claim 1 or 2 characterized by for said feed means consisting of feed rollers which have a small diameter part corresponding to the separation stroke of a sheet, and the path voluminousness corresponding to the feed stroke after separation stroke termination, and said separation means consisting of separation pads energized with a spring at this feed roller side.

[Claim 6] Said feed means consists of feed rollers which feed with a sheet, and said separation means consists of separation pads pressed with a spring to a feed roller. A sheet loading means by which load two or more sheets, and it is approached and estranged to a feed roller by the driving means is established. a sheet loading means -- a feed roller -- receiving -- contiguity or alienation -- the sheet feeding device according to claim 1 or 2 characterized by having a interlocking means to move a separation pad in the direction which estranges or approaches to a feed roller when moving.

[Claim 7] It is the sheet feeding device according to claim 6 which said sheet loading means has a medium plate loading a sheet, and is characterized by having the height which said interlocking means is formed in the cam member and separation pad which were prepared in the medium plate, and engages with a cam member.

[Claim 8] The sheet feeding device according to claim 6 or 7 characterized by the contact pressure of a separation means in case a medium plate does not pressurize a sheet to a feed roller, and a feed means being higher than the contact pressure of a separation means in case said medium plate pressurizes a sheet to a feed roller, and a feed means.

[Claim 9] Said conveyance means is a sheet feeding device according to claim 1 to 8 characterized by being a resist roller pair.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to amelioration of the multiple-manual-feeding feeding device formed in order to mainly send special papers, such as pasteboard which cannot be sent, and a postcard, colored paper, especially about the equipment which conveys sheets, such as paper, in image formation equipments, such as a reproducing unit and a laser beam printer, with the paper feed equipment from the cassette of the body of image formation equipment.

[0002]

[Description of the Prior Art] In recent years, in image formation equipment, especially an electronic copying machine, the paper of various sizes can be copied now with multistage-izing of a feed cassette, without replacing the paper in a cassette. Generally the white paper which the papers especially with high operating frequency are A4, A3 or B4, and B5, and is called a regular paper is used among the papers used at home. However, a user has an opportunity to send a form like an intermediate paper in a postcard, colored paper, and an OHP form pan besides such common paper, and such papers are conveyed from the manual bypass feeding device formed in dedication.

[0003] There are single manual bypass equipment and multiple-manual-feeding equipment in this manual bypass feeding device, and, generally the multiple-manual-feeding equipment which can set much papers at once has been used recently.

[0004] This invention explains the copying machine as an example of target image formation equipment below.

Drawing 7 is the sectional view of the target copying machine [this invention].

[0005] In drawing 7, it is in a cassette 13, and the paper as a sheet 15 currently loaded by the medium plate 14 is pressurized by the feed roller 16 with a medium plate, and with the feed roller 16, one sheet of upside paper is separated and it is conveyed by the resist roller 12. The resist of a lengthwise direction is adjusted by this resist roller. The manuscript image carried on manuscript glass 17 is irradiated with the lighting lamp 18, it irradiates on the photoconductor drums 21, such as an electrophotography photo conductor, through a mirror 19 and lens 20 grade, and a latent image is formed. This latent image is changed into a toner image by the development counter 22 using the toner as a developer. The location of a toner image and paper has timing taken by the resist roller 12, and a toner image is imprinted by the proper location of paper with the imprint roller 23 as an imprint means. After being conveyed by the fixing assembly 25, carrying out heating melting of the toner image and fixing paper to the paper after an imprint by the conveyance means 24 further, it is loaded into the paper output tray which is not illustrated with the delivery roller 26.

[0006] Further 8 is the tray of multiple-manual-feeding equipment, in the tray, as shown in drawing 8, the medium plate 9 is formed, and a medium plate 9 energizes above the paper loaded on the tray from the rear face of paper by the tray point, and contacts the front face of the paper on the top face of the maximum on the multi-feed roller 10 which consists of friction materials, such as rubber. Paper is energized by the feed roller 10 with a medium plate 9, and, as for a feed roller, paper is conveyed for rotation to the nip of the separation pad 1 and the feed roller 10 for the first time in the place where a feed roller and paper contacted. When fed with the paper pressurized with the medium plate 9 with the feed roller 10, two or more sheets, for example, two sheets, of papers may be conveyed, but if two sheets of this paper is conveyed as it is to a resist roller, it will become a double feed and a paper jam etc. will be generated inside a machine. In order to prevent this, the paper of the side near a separation pad among the papers in which two separation pads were conveyed, i.e., the bottom, is dammed up, that is, paper is separated so that only the topmost paper may be conveyed.

[0007] Generally a separation pad consists of tabular friction member 1a which the cork contained in polyurethane rubber, and supporter material 1b which supports this friction member, and this separation pad is pressurized by compression-spring 1c etc. from the lower part. This welding pressure is set up so that there may not be poor feed, i.e., the condition that paper cannot move, and the condition that two or more double feeds, i.e., paper, will be conveyed at a stretch. If there is specifically too little **, a double feed will occur, and if too high, poor feed will occur.

[0008]

[Problem(s) to be Solved by the Invention] After making the tip of paper advance into the nip of a resist roller, the

paper with which it was fed when feeding with paper from such multiple-manual-feeding equipment performs skew amendment when paper carries out a skew at the time of multi-feed, by once making a loop formation in resist roller this side, is that a resist roller takes optical system and a synchronization and begins rotation further, and performs alignment of the paper conveyance direction of paper and the image on a photoconductor drum. However, when the papers which are going to be conveyed are pasteboard, such as a postcard, at this time, the force in which the back end of paper tends to return to the paper conveyance direction and an opposite direction acts by making a loop formation.

[0009] The paper back end is pinched by a feed roller 10 and the separation pad 1 as shown in drawing 8, the force in which of the force which pressurizes the paper of a separation pad puts the paper in the separation pad section by cutting to the force pushed in the direction of arrow-head C, the price of the force, i.e., the separation pad, of the waist of paper in which the loop formation was formed, may decrease, and the phenomenon which the paper back end moves in the direction contrary to the paper conveyance direction may occur.

[0010] When this phenomenon occurs, the once formed loop formation can also decrease, or a proper quantity of a loop formation cannot form once, skew amendment is not fully performed or there is a possibility that the phenomenon in which the location at the tip of paper and the tip of an image shifts by this further may occur. The fields where adding a roller pair in the space restricted when manufacture cost went up a loop formation, although a back end side can also be held certainly makes a loop formation from preparing a conveyance roller pair between the feed roller section and a resist roller in order to prevent such un-arranging decrease in number, and it is expected that problems -- skew amendment etc. is not fully performed -- occur.

[0011]

[Means for Solving the Problem] In order to solve an above-mentioned problem, therefore, the 1st invention A feed means to feed with a sheet, and the separation means for opposite arrangement being carried out and dividing a sheet into a feed means, In the sheet feeding device which it has [feeding device] a conveyance means for it to be located in the sheet conveyance direction lower stream of a river, and to convey a sheet from a feed means, and the sheet tip with which it feeds with a feed means is dashed [feeding device] against a conveyance means, and makes a loop formation form in a sheet It is characterized by constituting the welding pressure to the sheet by the separation means and the feed means possible [fluctuation] during feed of the sheet by the feed means.

[0012] 2nd invention is characterized by the sheet in the condition of a separation stroke being completed and being fed with the sheet from the contact pressure of the sheet in the condition that two or more sheets are divided into the sheet of one sheet, and a separation means and the contact pressure of a separation means being high.

[0013] It carries out [that the 3rd invention increases the welding pressure to the sheet by the separation means by supporting said separation means rockable, establishing a migration means to make a separation means approach and estrange to a feed means, and carrying out rocking contiguity of the separation means with a migration means during feed of a sheet at a feed means side, and] as the description.

[0014] It is characterized by the 4th invention having the cam member which can rotate the migration means of said separation means freely, the reciprocation member guided by the guide member, the link which transmits movement of a cam member to a piston member, and the spring which transmits movement of a reciprocation member to a separation member.

[0015] It is characterized by consisting of feed rollers with which the 5th invention has a small diameter part corresponding to the separation stroke of a sheet in said feed means, and the path voluminousness corresponding to the feed stroke after separation stroke termination, and said separation means consisting of separation pads energized with a spring at this feed roller side.

[0016] The 6th invention consists of feed rollers with which said feed means feeds with a sheet. Said separation means consists of separation pads pressed with a spring to a feed roller. A sheet loading means by which load two or more sheets, and it is approached and estranged to a feed roller by the driving means is established. a sheet loading means -- a feed roller -- receiving -- contiguity or alienation -- when moving, it is characterized by having a interlocking means to move a separation pad in the direction which estranges or approaches to a feed roller.

[0017] It is characterized by having the height which said sheet loading means has a medium plate loading a sheet in the 7th invention, and said interlocking means is formed in the cam member and separation pad which were prepared in the medium plate, and engages with a cam member.

[0018] 8th invention is characterized by the contact pressure of a separation means in case a medium plate does not pressurize a sheet to a feed roller, and a feed means being higher from the contact pressure of a separation means in case said medium plate pressurizes a sheet to a feed roller, and a feed means.

[0019] 9th invention is characterized by said conveyance means being a resist roller pair.

[0020]

[Embodiment of the Invention]

One operation gestalt of the feeding device concerning this invention is explained below the [operation gestalt 1].

[0021] As shown in drawing 1, in order that a compression coil spring 2 may pressurize the separation pad 1, the end of this spring 2 is engaging with the separation pad 1. The piston member 3 as a reciprocation member is guided by the cylinder 4 of the shape of a cylinder as a guide member, and the other end of a spring 2 is installed in depression 3a prepared in the piston member 3 in it. Moreover, the end of a link 5 is connected with this piston

member 3, and the other end of a link 5 is connected with the cam plate 7 which rotates a shaft 6 as a core. The shaft 6 is connected with the driving means of the stepping motor which is not illustrated, and the controller which is not illustrated is performing control of this motor.

[0022] The immediately after feed roller 10 begins rotation by being pressurized by the feed roller 10 by being raised upward, one medium plate 9 is separated at a time by energization means, such as a spring which does not illustrate the paper as a sheet on a tray 8, with the feed roller 10 and the separation pad 1, and it is fed with paper by them. If a paper tip reaches the detection-before resist sensor 11 and a sensor detects a paper tip, the detection signal will be transmitted to a controller. Just before, as for a controller, paper makes a loop formation in response to this signal, a signal is emitted so that it may sense that it is and it may carry out specified quantity rotation at the cam plate drive motor which is not illustrated.

[0023] As shown in drawing 2, by rotation of the shaft 6 by the motor, the cam plate 7 begins rotation in the direction of arrow-head A, and moves the piston member 3 to it up. Before it raises a compression coil spring and the perfect loop formation of paper can do welding pressure of a lower part to the separation pad 1 like drawing 3 by this, the welding pressure of the separation pad 1 becomes max. Thus, by the inside of a separation stroke not changing welding pressure of the separation pad 1, but increasing into a loop-formation formation stroke, like before, a separation pad can lose the nerve of pasteboard, and can move to the pressurization direction and an opposite direction, i.e., a lower part, the posterior part of paper can retreat to the conveyance direction and an opposite direction, and it can prevent that loop-formation formation becomes imperfect. Although it is the level which poor feed generates since the welding pressure at this time is large as compared with the welding pressure at the time of usually separating paper and welding pressure is too high, a problem is not generated in the state of drawing 3 which the separation stroke has already completed.

[0024] If the optical scan system and timing which the resist roller 12 does not illustrate are taken and rotation is begun, separation pad ** does not need to be maintained by the high level as shown in drawing 3, and must return to the welding pressure of a basis for feed preparation of the following paper. Therefore, the cam plate 7 continues rotation further and returns to the location shown in drawing 1.

[0025] [Operation gestalt 2] Said operation gestalt was what is going to raise separation pad ** just before a loop formation is formed (i.e., just before separation pad ** begins reduction with the nerve of paper), after detecting the paper tip location. On the other hand, this operation gestalt considers beforehand the amount of conveyances from the separation pad of paper to a resist roller, tends to make the radius of gyration of ***** max for path voluminousness just before at the time of loop-formation formation, and tends to make it increase separation pad ** to the feed roller 10.

[0026] Drawing 4 is the sectional view showing other operation gestalten of this invention, and as the feed roller 10 is shown in drawing, path voluminousness 10a is formed.

[0027] The feed roller 10 already begins rotation from a standby condition, and drawing 4 shows the condition in the middle of feeding with paper. A feed roller will be in the condition of drawing 5 by continuing rotation further from this condition. The paper back end seems for the compression coil spring 2 supported by spring cradle 2a of immobilization to be compressed, and to increase the welding pressure to the separation pad 1, and not to reverse to the upstream, even if a loop formation as shown in drawing occurs in order that the feed roller 10 may depress the separation pad 1 below (the direction of arrow-head B) in the field of the path voluminousness.

[0028] In the feeding device of this operation gestalt, the feed roller 10 must return to a standby condition uniformly at the time of a feed start. In drawing 4, a feed roller stands by in the condition corresponding to friction member point 1a of a separation pad in standby point 10a on the feed roller 10. A feed start is carried out from this condition, and in order to separate one sheet of paper at a time, without causing poor feed with a feed roller and a separation pad, the feed roller 10 is made more nearly circular [the predetermined range of a hand of cut and an opposite direction / the usual criteria radius] than standby point 10a. As shown in drawing 4, after a medium plate 9 descends and a separation stroke finishes, before forming the loop formation of paper, path voluminousness 10a is formed in the predetermined range from initiation point 10c so that separation pad ** can be increased.

[0029] This operation gestalt can make loop-formation formation of the paper after a paper tip reaches a resist roller more perfect than said operation gestalt by little easy configuration of components mark.

[0030] [Operation gestalt 3] As explained previously, if separation pad ** is not proper ** when one sheet tends to dissociate from two or more papers, poor feed and a double feed will generate it. It says that it must be this proper ** from the operating sequence of this feeding device, and it can be said that it is in the condition that the medium plate is making paper pressurize to a feed roller. The order of actuation of a medium plate 9 and the feed roller 10 is explained using drawing below.

[0031] The medium plate is supported rockable centering on the revolving shaft, and is pressurized with the compression coil spring which is not illustrated like a separation pad from a lower part. Rocking is begun that the paper carried on the surface of the medium plate by the medium plate driving means means which is not illustrated from this condition should be pressurized as feed RORAHE **. **** [completion of pressurization / begin / a feed roller / and / rotation] Under the present circumstances, if the welding pressure of a medium plate is not fully being improved, a feed roller and paper will slip. When a paper tip will advance into the nip of a feed roller and a separation pad if a feed roller rotates, and a separation pad pressurizes paper further at a feed roller, the conveyance

force of a feed roller over paper occurs, and, as for paper, even a resist roller becomes conveyed only by this force according to this operation. Therefore, in accordance with this timing, the semantics to which a medium plate pressurizes paper to a feed roller is lost, and a medium plate descends by the driving means. A double feed occurs according to the conveyance force produced in order that a medium plate may pressurize paper at a feed roller, if this stage medium plate does not descend. Although a separation pad carries out the operation which dams up excessive paper when paper advances into two or more sheet nip, this conveyance force strikes and cuts this in the force which is going to dam up excessive paper, for this reason, it causes poor separation, and becomes a double feed.

[0032] Although it is a separation pad at the separation stroke time of paper and separation pad ** must maintain a suitable amount to paper separation in this stage while that it can say from the above operating sequence is going up, in order that a medium plate may pressurize paper at a feed roller, in the condition that the medium plate except this stage that is, is descending, separation pad ** has a degree of freedom.

[0033] This operation gestalt tends to apply above-mentioned reason, tends to be interlocked with actuation of a medium plate, and tends to change separation pad **.

[0034] Drawing 6 is the sectional view showing this operation gestalt. The medium plate 9 shown in this drawing has center-of-rotation 9a, and it is supported so that it can rock with the driving gear which does not illustrate this as a core. To a feed roller, the condition that a medium plate 9 shows a continuous line is in a pressurization condition, and the cam 27 which rotates a center-of-rotation [of a medium plate] and same axle top in one with a medium plate at this time is also in the location of a continuous line. After the paper on a medium plate advances into the nip of a separation pad and a medium plate ends the duty, a medium plate rotates to a dotted-line location at a cam and one (the direction of arrow-head D). As shown in drawing, when it contacts the separation pad which is made of resin at this time, and the height 28 of the elasticity which consists of one and a cam 27 carries out press deformation of this height 28 The separation pad 1 rotates around 1f of revolving shafts, and it is energized at a feed roller side, and feed roller ** can go up from the proper value over separation, even if a loop formation is formed, it can hold paper certainly, and it can stop reduction of the amount of loop formations.

[0035]

[Effect of the Invention] A feed means to feed with a sheet according to this invention as explained above, In the sheet feeding device which the separation feed of every one sheet is carried out [feeding device] with the separation means by which opposite arrangement was carried out at the feed means, and a sheet tip is dashed [feeding device] against a conveyance means by which it is located in the sheet feed direction lower stream of a river from a feed means, and makes a loop formation form in a sheet Since fluctuation of the welding pressure to the sheet by the separation means and the feed means was enabled during the sheet feed by the feed means The welding pressure of the separation means at the time of loop-formation formation is raised, and without losing the repulsive force of a sheet in the back end of the sheet with which the loop formation was formed of this, a separation means and a feed means can hold certainly and can prevent poor skew amendment and a poor image location beforehand.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing in which separation pad ** of 1 operation gestalt of the feeding device concerning this invention shows the minimum condition

[Drawing 2] Drawing in which separation pad ** of 1 operation gestalt of the feeding device concerning this invention shows a middle condition

[Drawing 3] Drawing in which separation pad ** of 1 operation gestalt of the feeding device concerning this invention shows the greatest condition

[Drawing 4] Drawing showing the condition in the middle of feed of the 2nd operation gestalt of the feeding device concerning this invention

[Drawing 5] Drawing in which separation pad ** of the 2nd operation gestalt of the feeding device concerning this invention shows the greatest condition

[Drawing 6] Drawing showing the 3rd operation gestalt of the feeding device concerning this invention

[Drawing 7] The sectional view of the target electronic-in this invention copying machine.

[Drawing 8] The sectional view explaining the trouble generated with the conventional multiple-manual-feeding feeding device.

[Description of Notations]

1 -- Separation pad

1a -- Friction member

2 -- Spring

2a -- Spring cradle

3 -- Piston member

4 -- Cylinder

5 -- Link

6 -- Shaft

7 -- Cam plate

8 -- Tray

9 14 -- Medium plate

10 16 -- Feed roller

10a -- Path voluminousness

10b -- Standby point

10c -- Initiation point

11 -- Sensor

12 -- Resist roller

13 -- Cassette

15 -- Sheet

21 -- Photoconductor drum

22 -- Development counter

25 -- Fixing assembly

27 -- Cam

28 -- Height

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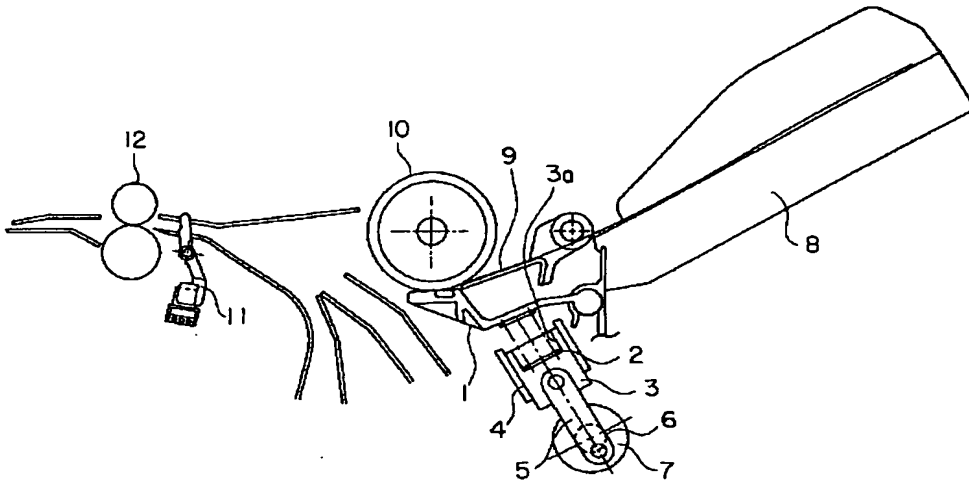
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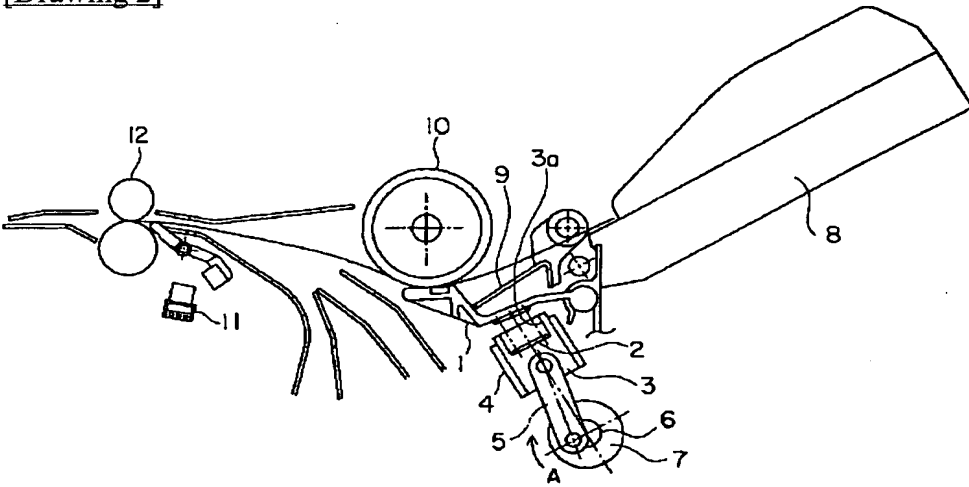
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DRAWINGS

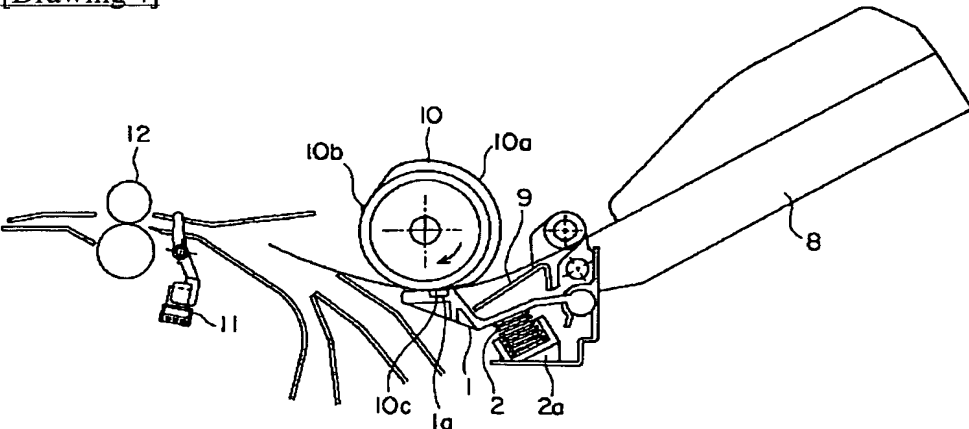
[Drawing 1]



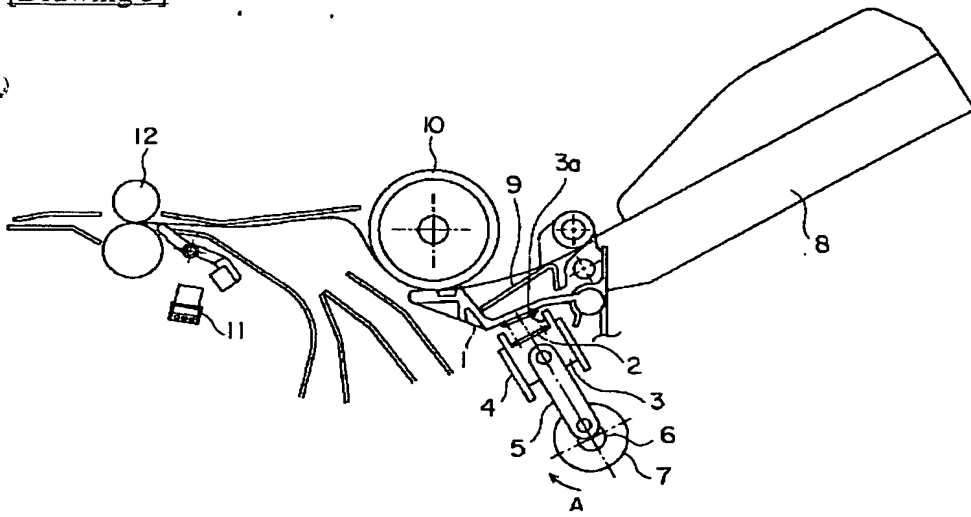
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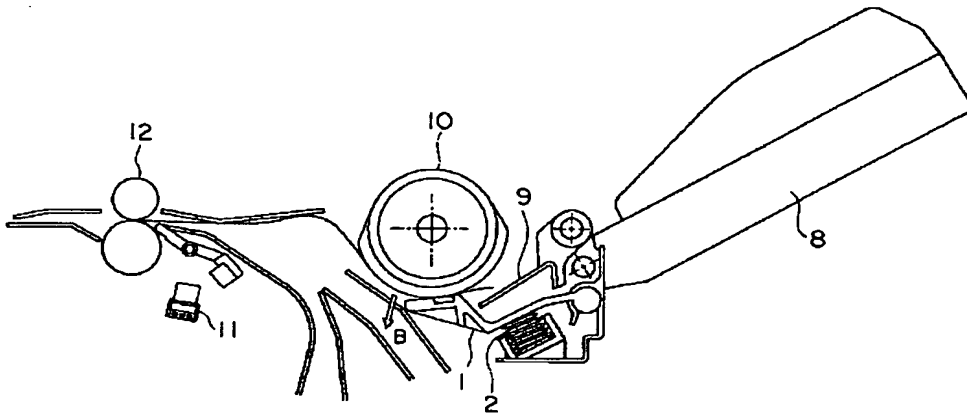
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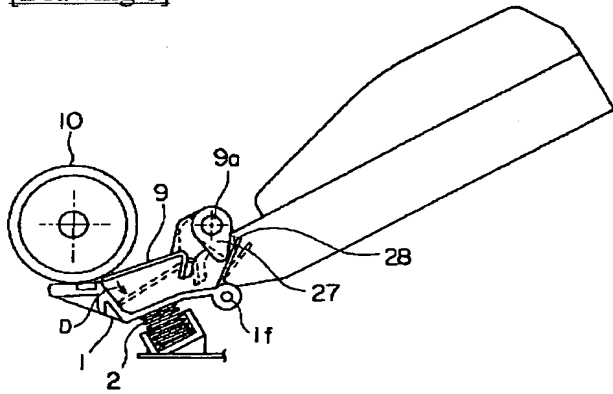
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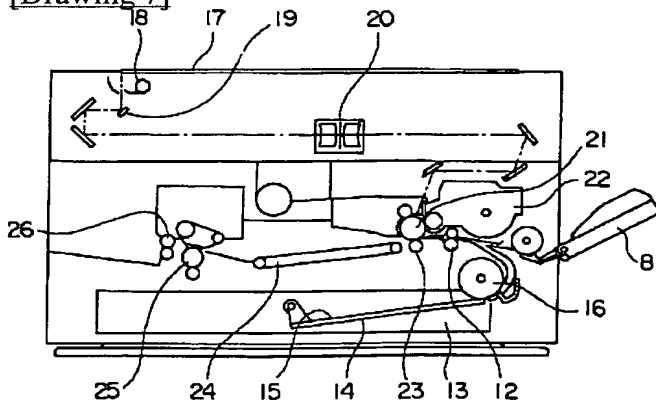
[Drawing 5]



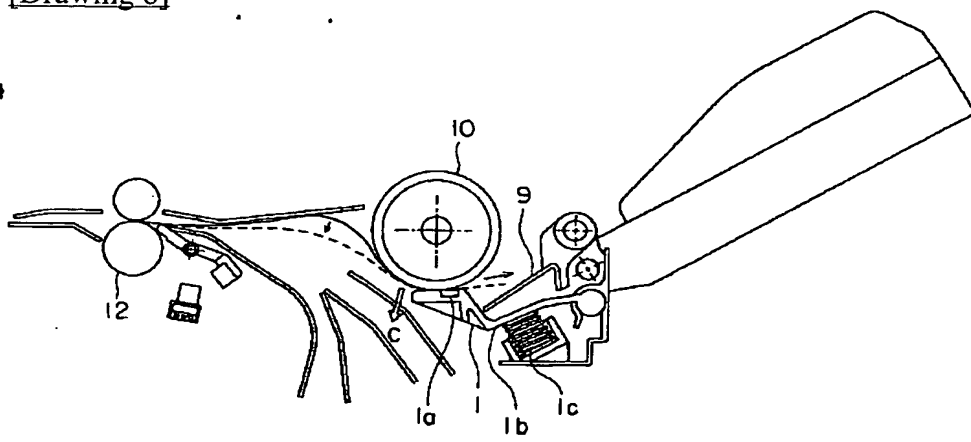
[Drawing 6]



[Drawing 7]



[Drawing 8]



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